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The effects of different anesthetic approaches on recurrence in the surgical treatment of ganglion cysts

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ABSTRACT

Aim: The surgical treatment of ganglion cysts usually involves local anesthesia (LA), regional anesthesia (RA), and axillary block applications. We aimed to show the effects of these anesthesia types on recurrence in surgically treated ganglion cysts.

Material and Method: Between 2017-2019,142 patients were operated on in our clinic due to the dorsal ganglion cyst of the wrist. Cysts outside the dorsal region and patients who did not regularly attend their follow-up visits for at least 12 months were excluded. One hundred and thirty-five patients, with a mean age of 39.3 (15-73) years, were included in the study. LA (Group I) was applied to the patients who stated that they could tolerate the pain, and RA was used on those who stated that they could not (Group II) after preoperative anesthesia consultations. The files of the patients in both groups were reviewed retrospectively, and the effect of anesthesia type on recurrence was investigated.

Results: Recurrence rates were significantly lower in the RA group compared to those in the LA group (p=0.049). The risk of recurrence in the LA group was 2.80 (0.95-8.28) times higher than in the RA group. The mean operation time of the RA group was significantly lower than that of the local anesthesia group (p=0.0001).

Conclusion: The fact that RA allows tourniquet applications with deeper and longer-lasting anesthesia compared to LA increases surgical comfort and makes way for the comfortable dissection of the cyst and total excision of all components within a short operative time.

Keywords: Benign tumors, ganglionic cysts, surgical treatment, local anesthesia, recurrence

Our research's data was presented in 31st National Orthopedics and Traumatology Congress as ''Poster Presentation'' on October 2022.

INTRODUCTION

Ganglion cysts are the most common benign soft tissue tumors encountered in orthopedic surgery. Although common among every age group, it peaks between 20-40 years of age. The incidences in males and females are 25/105, and 43/105, respectively (1-3). Around 60-70% is localized on the dorsal aspect of the wrist. Wrist ganglia are usually 1–2 cm in diameter, cystic, hard structures associated with the underlying joint capsule or tendon sheath (2-4).

Although the etiology is not fully elucidated, long-term microtrauma and stress, especially resulting in mucinous degeneration of the connective tissue, are considered causative factors (4,5). Ganglion cysts typically originate from the connective tissue such as the joint capsule and tendon sheaths, and less frequently from the bone (5).

Most ganglion cysts are asymptomatic(5,6). Anamnesis and examination are usually sufficient for diagnosis. Some patients may present with symptoms such as pain aggravated by wrist movements, tenderness, weakness, and decreased range of motion (7-9). Despite all these clinical findings, the most common complaint is a painless mass. Patients usually visit the physician for cosmetic reasons and sometimes out of fear that the swelling may be a malignant growth. The recurrence rate of conservative treatments is quite high. The aim of surgical treatment is the total excision of the cyst with its sac (9,10).

In our retrospective study, we aimed to show the effects of different anesthetic applications on recurrence in the surgical treatment of ganglion cysts.

MATERIAL AND METHOD

The study was carried out with the permission of Sakarya University Medical Faculty Clinical Researches Ethics Committee (Date: 08.08.2022, Decision No: 04-155097-223). Because the study was designed retrospectively, no written informed consent form was obtained from patients.

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One hundred and forty-two patients were operated on due to ganglion cysts at surgical margins by a single surgeon in a single center between 2017-2019.

A total of 135 patients met the inclusion criteria(cysts larger than 1 cm in diameter), and patients with cysts outside the dorsal region of the wrist, recurrent cases and those who did not regularly attend follow-up visits for at least 12 months were excluded from the study. Preoperative anesthesia consultation was requested from the patients who stated that they could not tolerate LA, and an axillary block with RA was performed. LA was given to the patients who stated that they could tolerate the pain. The patients were divided into two groups: Those who underwent LA were named Group I (72 patients), and those who underwent RA were named Group II (63 patients). The groups were evaluated according to the development of recurrence at the postoperative 3rd, 6th, and 12th months. 1000 mg of cephazolin sodium was administered to the patients intraoperatively. The surgical technique consisted of approaching the dorsal ganglion cyst with a transverse incision made directly over the cyst. A tourniquet was also used in Group II patients. All layers were carefully dissected to expose the pedicle of the cyst and prevent its rupture. Following the excision of the cyst and control of bleeding, the layers were closed anatomically. An elastic bandage wrapped around the wrist. The patients were discharged with oral antibiotics and NSAID prescriptions 4 hours postoperatively with the advice of the anesthesiologists.

Statistical Evaluation

Statistical analyses were performed with NCSS (Number Cruncher Statistical System) 2007 Statistical Software (Utah, USA) package program. In addition to descriptive statistical methods (mean, standard deviation) used, the distribution of the variables was checked with the Shapiro-Wilk normality test. The Independent t-test was used for the comparison of normally distributed variables and the Chi-square test was used to compare qualitative data. The results were evaluated at the significance level of $p<0.05$.

RESULTS

The mean age of the patients was 39.3 (15-73) years. The mean follow-up times were 16,32±2,72 months and 16,02±2,45 months for groups I and II, respectively. Among the 72 patients in Group I, 27 were males and 45 were females. In this group, operations were performed on 44 right and 28 left extremities. Of the 63 patients in Group II, 22 were males and 41 were females, with 37 right and 26 left extremities operated on. The mean operation times were 20,21±4,78 minutes, and 15,48±4,64 minutes for groups I and II, respectively. Recurrence was observed in 14 (19.44%) Group I patients, and 5 (7.94%) Group II patients within the first six postoperative months (**Table 1**).

Table 1: The demographic, surgical, and follow-up data of the patients

	Local Anesthesia n=72		Regional anesthesia (Axillary Block) N=63		p
Age	39.96±13.5		38.68±12.89		0.577
Gender					0.756
Males	27	37.50%	22	34.92%	
Females	45	62.50%	41	65.08%	
Lateralization					0.778
Right	44	61.11%	37	58.73%	
Left	28	38.89%	26	41.27%	
Follow-up time	16.32±2.72		16.02±2.45		0.499
Duration of operation	20.21±4.78		15.48±4.64		0.0001
Recurrence					0.046
No	58	80.56%	58	92.06%	
Yes	14	19.44%	5	7.94%	

There were no significant differences between the LA and RA (axillary block) groups in terms of mean age or gender distributions (p=0.577, and p=0.756, respectively), lateralization of cysts (p=0.778), or follow-up times (p=0.499). The duration of operation of the RA (axillary block) group was significantly shorter than that of the LA group (p=0,0001), (**Figure 1**), similar to recurrence rates (p=0,049).The risk of recurrence in the LA group was 2.8 (0.95- 8.28) times higher compared to that in the RA group (**Figure 2**).

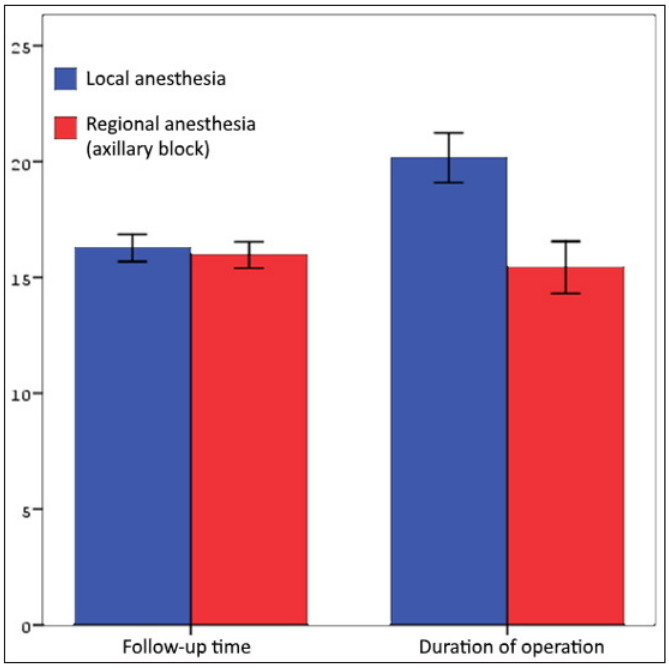

Figure 1: The comparison of follow-up time and duration of operation with respect to anesthesia types

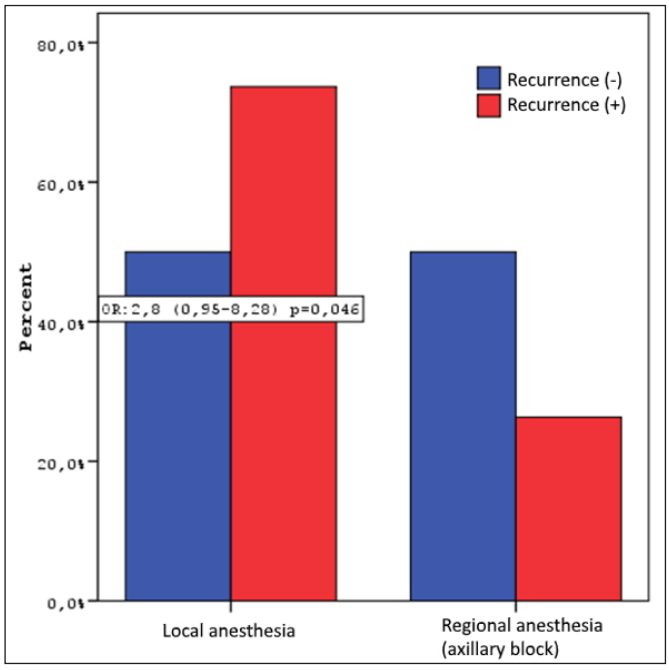

Figure 2: Recurrence rates with respect to anesthesia types

DISCUSSION

The purpose of the surgery in ganglion cysts is the complete excision of the cyst with its sac. Careful dissection is aimed to expose the pedicle of the cyst and prevent its rupture (9-12). Failure to resect the cyst pedicle, capsule connections, and part of the capsule is associated with a high rate of recurrence (11-14). The most common complication after surgical excision is recurrence, with a rate of 40%. The most significant reason for recurrence is the incomplete excision of the cyst due to insufficient dissection. Studies show that the recurrence rate decreases to 5% in cases where the entire cyst complex, including the pedicle and associated joint capsule, is removed (13,14).

RA has advantages over LA in the development of recurrence in surgical treatment. In our study, we found the recurrence rates to be significantly lower in patients who received RA compared to those who received LA, the operation time to be considerably shorter, and total excision to be considerably easier owing to the use of tourniquets and the looseness of the tissue in RA.

Suen et al. (15) reported that non-surgical treatment was largely ineffective in the treatment of ganglion cysts and that surgical intervention reduced recurrence rates compared to conservative treatment. Trivedi et al.(16) reported that blunt force was effective in the treatment of ganglion cysts and no recurrence was observed in their 24-month follow-up. Chaudhary et al. (17) stated that surgical excision is the gold standard in ganglion treatment, but the complication rate after surgical excision is significantly higher than in aspiration treatment, also reporting that the most common complications were wound infection, neuroma, and hypertrophic scar.

Öztermeli et al. (18) reported that 83.3% of volar ganglion cysts and 16.7% of dorsal ganglion cysts recurred and they performed all operations under local anesthesia using a tourniquet. They attributed the high recurrence rate in volar cysts to the anatomical structure of this region, with which we disagree. Since the operation of the patients under RA instead of LA will allow for a comfortable dissection of deep tissues, total removal of the cyst will be possible. We think that the high recurrence rates in this study are due to the partial excision of the cyst due to operating under local anesthesia . Meyerson et al. (19) reported that the previous aspiration of the cyst increased recurrence rates and the recurrence rate of ganglion cysts in children was 5.3% . Sinha et al. (20) reported a high recurrence rate of 90% in their study using aspiration and steroid injection in the treatment of ganglion cysts. On the other hand, Graham et al. (21) reported the recurrence rate as 9.8% after the reoperation of recurrent ganglion cysts.

There are various limitations to our study, two of which are the lack of the randomization of patients preoperatively and the retrospective design. Also, although the number of patients seems sufficient to reach accurate results, we think that further studies with more patients may be more beneficial.

CONCLUSION

Although many methods are used in the treatment of ganglion cysts, the gold standard is surgical treatment. Surgical treatment should aim to minimize recurrence, for which the total excision of the cyst is essential. Anesthetic conditions must be suitable for total excision for both the surgeon and the patient. Regional anesthesia allows tourniquet application with deeper and longer-lasting anesthesia compared to local anesthesia, increasing surgical comfort and providing total dissection of the cyst within a short time. We predict that choosing regional anesthesia over local anesthesia for well-selected ganglion cyst patients will further reduce recurrence. Hoping that our study will shed light on future studies, we think that more comprehensive studies are needed.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Sakarya University Medical Faculty Clinical Researches Ethics Committee (Date: 08.08.2022,, Decision No: 04-155097-223).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients**.**

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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